**ASSESSMENT OF THE PERSEPECTIVES OF PRACTITIONERS ON CARBON TAX MECHANISM TO ENCOURAGE THE USE OF ELECTRIC VEHICLES USED IN Road FREIGHT TRANSPORT ACTIVITIES IN THAILAND**

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Use black cover with gold text

Author name shall be assigned to be middle of page and between the texts.

**SATTRA VUTHY**

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Thesis code: KMITL-2017-IC-M-002-002 will be provided by officer.

**A Thesis Report Submitted in partial fulfillment**

**of the Requirements for THE DEGREE OF**

**Master OF SCIENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT**

**INTERNATIONAL COLLEGE**

**KING MONGKUT’S INSTITUTE OF TECHNOLOGY LADKRABANG**

**2017**

Use the year when report is finish

**KMITL-2017-IC-M-002-002**

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This page is the duplication of the first page.

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**2017**

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| **Thesis Title** | Assessment of The Perspectives of Practitioners on Carbon Tax Mechanism to Encourage the Use of Electric Vehicles Used in Road Freight Transport Activities in Thailand |
| **Student** | Mr. Sattra Vuthy |
| **Student ID** | 58610044 |
| **Degree** | Master of Science |
| **Program** | Logistics and Supply Chain Management  (International Program) |
| **Thesis Advisor** | Asst. Prof. Dr. Ronnachai Tiyarattanachai |
| **Thesis Co-Advisor** | Dr. Jaruwit Prabnasak |
| **Thesis Reference Number** | KMITL-2017-IC-M-002-002 |

|  |  |
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| **EXAMINERS** | **SIGNATURES** |
| Dr. Siradol Sirithorn |  |
| Asst. Prof. Dr. Phaophak Sirisuk |  |
| Asst. Prof. Dr. Wichitsawat Suksawat na Ayudhya |  |
| Dr. Jaruwit Prabnasak |  |
| Asst. Prof. Dr. Ronnachai Tiyarattanachai |  |

**Date**: May 13th, 2017 **Time** 13.00 – 15.00

**Place**: International College, 8th floor, 55­th Anniversary Chalermprakiat Building

KING MONGKUT’S INSTITUTE OF TECHNOLOGY LADKRABANG

(Assoc. Prof. Dr. Supat Kittiratsatcha)

Dean of International College

May 13th, 2017

1st Section break

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| **THESIS TITLE** | Assessment of the Perspectives of Practitioners on Carbon Tax Mechanism to Encourage the Use of Electric Vehicles Used in Road Freight Transport Activities in Thailand |
| **STUDENT NAME** | Mr. Sattra Vuthy |
| **STUDENT ID** | 58610044 |
| **DEGREE** | Master of Science |
| **PROGRAME** | Logistics and Supply Chain Management |
| **ADVISOR** | Asst. Prof. Dr. Ronnachai Tiyarattanachai  Set as Heading 1: **bold**, all cap, center of the page, and double line spacing.  After heading 1, leave one empty line (single line spacing) |
| **CO-ADVISOR** | Dr. Jaruwit Prabnasak |

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# ABSTRACT

As climate change issue became one of the most important global problems, Carbon dioxide (CO2) mitigation plan has become an important agenda of many nations around the world. Carbon pricing tools are the real market-based instruments, and they are suggested as an effective incentive for stakeholders to reduce the emission. Specifically, carbon tax is one of the carbon pricing tools, and it is seen as an easier mechanism to implement compared to Cap and Trade system due to administrative cost and procedures. In Thailand, CO2 from transportation accounts for about a quarter of all CO2 emissions. Starting from Jan 1st, 2016, new vehicle excise tax has come to effective for passenger vehicles, while road freight vehicle is paid less attention on emission reduction. In road transport activities, passenger and road freight vehicles share almost the same proportion in a global view. Hence, this study aims to assess the perspectives of logistics practitioners on diverse topics such as Green Logistics, electric vehicle (EV) utilization in road freight activities, carbon tax proposal, and its possibilities and challenges to implement in order to incentivize the use of EV in road freight activities in Thailand. Qualitative survey was conducted for the perspective assessment. This study employed both descriptive (cross tabulation) and inferential (Two-Way Chi Square) statistics to interpret and confirm relationship of the data and variables of the survey. As the result, the study found out that carbon tax proposal can be possible to implement. But supports of all key players such as customers, automakers and government are the highly important input for this new proposal.

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# ACKNOWLEDGEMENT

Without the contribution of many people, this thesis would not have been existed. It owes the existence to the supports and inspirations from a lot of people.

To my thesis advisor Asst. Prof. Dr. Ronnachai Tiyarattanachai and co-advisor Dr. Jaruwit Prabnasak of International College at King Mongkut’s Institute of Technology Ladkrabang, I would like to express my deepest gratitude for the encouragement and supervision through all obstacles and challenges since the beginning until the end of my study.

I also want to express my gratitude to all lecturers for your support and guidance to me for the whole two years. Also, I would like to thank all my friends who always be there to support and motivate me as always. Moreover, I also would love to express my gratitude to all respondents who contribute their information and time on this study. And I do believe the study could not been done without their input.

Finally, I must express my very greatest gratitude to my parents and all relatives for providing me with unfailing support and continuous motivation throughout my years of study. This accomplishment would not have been possible without them.

Sattra Vuthy

# TABLE OF CONTENTS

‘**Chapter**’ and ‘**Page**’ should be listed again.

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Modify the table into double for line spacing  
  
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**Chapter Page**

[ABSTRACT I](#_Toc483347139)

[ACKNOWLEDGEMENT III](#_Toc483347140)

[TABLE OF CONTENTS IV](#_Toc483347141)

[TABLE OF CONTENTS V](#_Toc483347142)

[LIST OF TABLES VI](#_Toc483347143)

[LIST OF FIGURES VII](#_Toc483347144)

[LIST OF SYMBOLS VIII](#_Toc483347145)

[LIST OF DEFINITIONS IX](#_Toc483347146)

[CHAPTER 1 INTRODUCTION 1](#_Toc483347147)

[1.1 Research Background 1](#_Toc483347148)

[CHAPTER 2 LITERATURE REVIEW 3](#_Toc483347149)

[CHAPTER 3 RESEARCH METHODOLOGY 4](#_Toc483347150)

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[4.1 Demographical and Operational Information of the Observations 5](#_Toc483347155)

[CHAPTER 5 CONCLUSIONS AND RECOMMENDATIONS 7](#_Toc483347156)

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# TABLE OF CONTENTS

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In case, it is longer than one page “**(Continued)**”,”**Chapter**” and “**Page**” shall be added.

**Chapter Page****LIST OF TABLES**

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**Table Page**

[**Table 4.1** Frequency and descriptive table of demographical factors 6](#_Toc483345579)

# LIST OF FIGURES

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In case, it is over one page additional “**(Continued)**” ,”**Chapter**” and “**Page**” should be added as above.  
  
“”

**Figure Page**

[**Figure 1.1** Greenhouse gases emitted by sectors in 2015 1](#_Toc483345592)

# LIST OF SYMBOLS

A List of Symbol is optional - Nomenclature or List of Terms may also be used.

|  |  |
| --- | --- |
| ***χ*2** | Chi-square test |
|  |  |
|  |  |

# LIST OF DEFINITIONS

A List of Definitions is optional - Nomenclature or List of Terms may also be used.

|  |  |
| --- | --- |
| **GHGs** | Greenhouse gases |
|  |  |
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2nd Section break

# INTRODUCTION

Create numbering as “Chapter 1”  
shift + enter > “name of the heading 1”

Paragraph: set “Hanging” to “0”

Before sub chapter: one empty line (double space)

## Research Background

In the past decades, climate change problem has become one of the most important global issues. The World finally accepted that climate change really exists ([UNFCCC, 2014a](#_ENREF_45)). “Climate Change” is defined as the effects from decomposition of atmosphere directly or indirectly of human being actions ([Fridahl, 2017](#_ENREF_12)).

Main text:

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First line indent: 0.5”

Line spacing: double

**Figure 1.1** Greenhouse gases emitted by sectors in 2015

Source: IPCC, I. P. o. C. C. (2015). Climate Change 2014: Mitigation of Climate Change (Vol. 3): Cambridge University Press.

Caption generation: by Tab Reference > Insert Caption

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Figure and its number: set to **BOLD**

Number of Figure followed by number of chapter, and separate by “Dot**” (Figure 1.1)**

Line spacing: single

One Space before Source

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Before next paragraph, line spacing: multiple

Source: reference followed APA 6th full components

Figure and its number: set to **BOLD** and Font: Time New Roman 12pt

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Electricity and heat production, industry and transport sectors are the main contributors of total emission. And there are national and international mechanisms, which are currently practicing in order to reduce the emission. For electricity, the trend of renewable and alternative energies have developed and encouraged widely. Those applications of alternative energies are generating electricity and energy from wind, solar, biofuels, biomass, hydro, geothermal, and marine. Investment of these applications of alternative energies was $ 285. Billions in 2015, which had 5% growth compare to year 2014 investment and 18% increased for period of year 2004 till 2015 ([Joseph et al., 2016](#_ENREF_20)).

Page number in simple character

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Before a level 1.2 headings insert a one empty line (double space)

## (Heading)

In the past decades, climate change problem has become one of the most important global issues.

**1.2.1 (Subheading)**

Before a subheading insert a 12pt spacing and always flushed to the left.

The World finally accepted that climate change really exists (UNFCCC, 2014a). “Climate Change” is defined as the effects from decomposition of atmosphere directly or indirectly of human being actions (Fridahl, 2017).

1. Electricity and heat production, industry and transport sectors are the main contributors of total emission.

Use single space within the items, but use double space between two items on the list

2. There are national and international mechanisms, which are currently practicing in order to reduce the emission.

3. Those applications of alternative energies are generating electricity.

# LITERATURE REVIEW

# RESEARCH METHODOLOGY

# RESULTS AND DISCUSSION



## Demographical and Operational Information of the Observations

In order to determine the sample size of the study, Yamane Taro’s formula for sample size is followed to calculate the specific required number of the samples ([Yamane, 1967](#_ENREF_50)). The confidential level of the study in 95% or with sampling error of 5%. The formula and notation are as below:

Use a non-boundary table with one row and two columns for the formula and its number

Number of equation followed by “Chapter#. Number:”

One empty line (double space) before and after table of equation

|  |  |
| --- | --- |
|  | (4.1) |

Where n = sample size to be surveyed

N = total number of population

e = level of precision or sampling of error (0.05)

As total number of population is 36,746 companies, and the confidential level is 95% (e=0.05), hence number of sample size for this study is 395.7 or 395 companies.

After distributing the 585 questionnaires to total population through post mail service and e-mail, there are total 24 respondents responded the survey in total. Demographical information about respondents mostly are questions in section 1 and 2. Specifically, demographical information in the study are company business types, types of transport service, share of inter and intra city tot total shipments, current fuel types use for vehicle, number of employees, number of vehicles, and the company revenue.

**Table 4.1** Frequency and descriptive table of demographical factors

Caption generation: by Tab Reference > Insert Caption above table

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Table and its number: set to be **Bold**

Number of table followed by number of chapter, and separate by “Dot” (**Table 4.1**)

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|  |  |  |  |
| --- | --- | --- | --- |
| Company Business Types | Frequency | Percent | Valid Percent |
| Sole Proprietorship | 18 | 75 | 92.3 |
| Corporation | 6 | 25 | 7.7 |
| Total | 24 | 100.0 | 100.0 |

Source: IPCC, I. P. o. C. C. (2015). Climate Change 2014: Mitigation of Climate Change (Vol. 3): Cambridge University Press.

Source:

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Source: reference followed APP 6th full components

# CONCLUSIONS AND RECOMMENDATIONS

# REFERENCES

Reference shall be in APA 6th edition.

Aldy, J. E., & Stavins, R. N. (2011). The Promise and Problems of Pricing Carbon: Theory and Experience.

Antimiani, A., Costantini, V., Kuik, O., & Paglialunga, E. (2016). Mitigation of adverse effects on competitiveness and leakage of unilateral EU climate policy: An assessment of policy instruments. *Ecological Economics, 128*, 246-259. doi: <http://dx.doi.org/10.1016/j.ecolecon.2016.05.003>

Antimiani, A., Costantini, V., Martini, C., Salvatici, L., & Tommasino, M. C. (2013). Assessing alternative solutions to carbon leakage. *Energy Economics, 36*, 299-311. doi: <http://dx.doi.org/10.1016/j.eneco.2012.08.042>

Chan, C. C. (2002). The state of the art of electric and hybrid vehicles. *Proceedings of the IEEE, 90*(2), 247-275. doi: 10.1109/5.989873

Cheng, Y.-H., Chang, Y.-H., & Lu, I. J. (2015). Urban transportation energy and carbon dioxide emission reduction strategies. *Applied Energy, 157*, 953-973. doi: <http://dx.doi.org/10.1016/j.apenergy.2015.01.126>

CSCMP. (2016). CSCMP Supply Chain Management Definitions and Glossary. Retrieved from Council of Supply Chain Management Professionals (CSCMP) website: https://cscmp.org/supply-chain-management-definitions

# APPENDIX A

# APPENDIX B

# AUTHOR BIOGRAPHY

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|  |  |
| --- | --- |
| **Author:** | Mr. Sattra Vuthy |
| **Degree:** | Master of Science |
| **Date:** | 13th May 2017 |
| **Date of Birth:** | 20th May 1992 |
| **Place of Birth:** | Battambang, Cambodia |

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**Undergraduate and Graduate Education:**

Master of Science in Logistics and Supply Chain Management,  
King Mongkut’s Institute of Technology Ladkrabang, Bangkok, 2017

Bachelor degree in Business Management,  
University of Cambodia, Phnom Penh, 2014

List the most

Recent degree first

**Major:** Logistics and Supply Chain Management

**Presentations and Publications:**

Vuthy S., Tiyarattanachai. R., and Prabnasak J. “Carbon Pricing Systems for Vehicles Used in Freight Transport,” Proceedings of the 7th International Conference on Operation and Supply Chain Management, Phuket, Thailand, pp. 429-440, December 2016.

Paragraph > Indentation > Use hanging by 0.05